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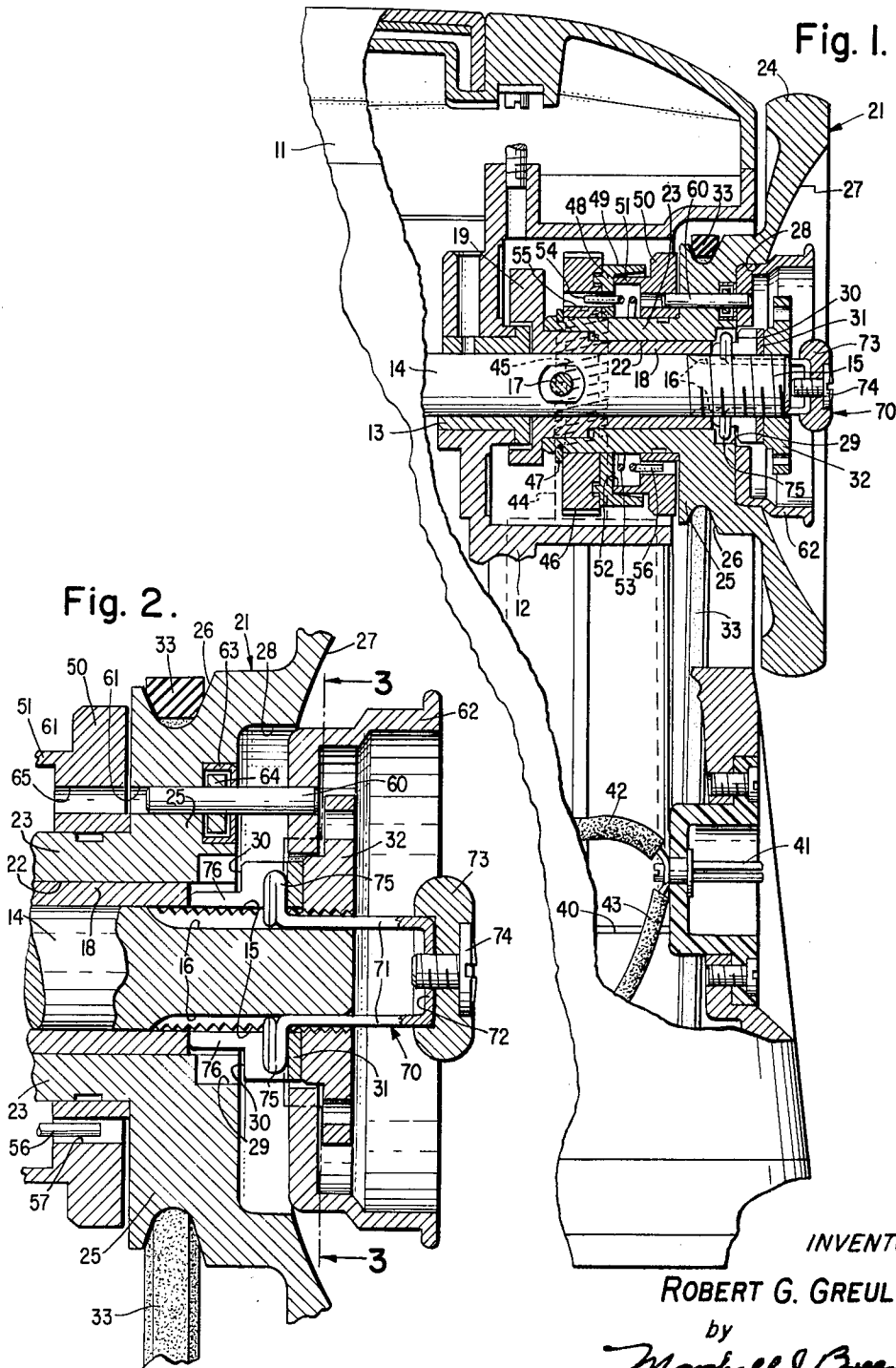
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SEWING MACHINE DRIVING DEVICES

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Fig. 3.

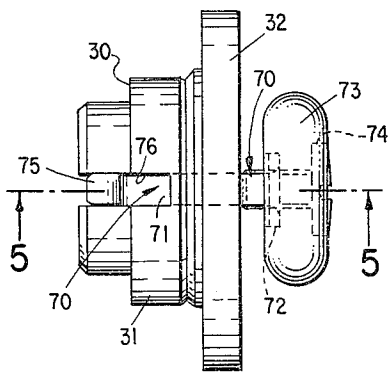
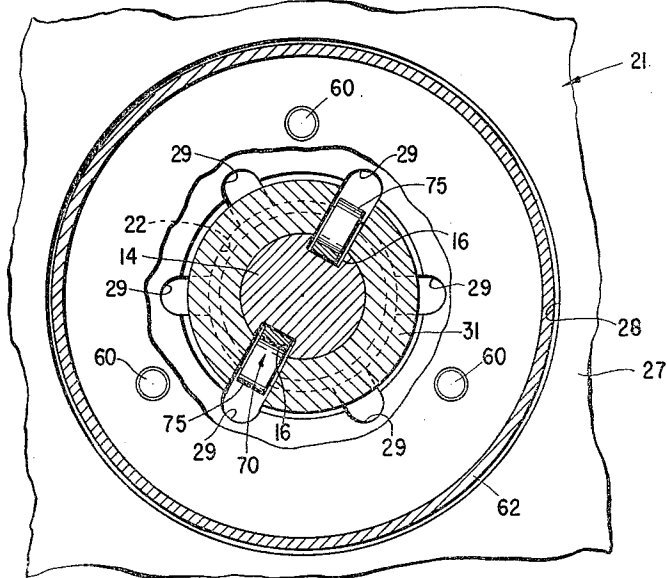


Fig. 4.

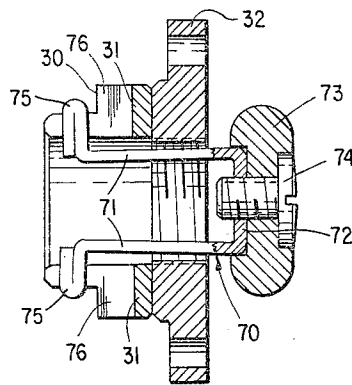


Fig. 5.

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SEWING MACHINE DRIVING DEVICES

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This invention relates to driving devices for sewing machines, and more particularly, to a drive which may be converted quickly and conveniently to accommodate alternative sources of power.

Both foot treadles and electric motors are well known as sources of sewing machine power and it is known in the art to convert sewing machines from one source of power to another. Such known conversions however require, the use of tools, the exchange of parts, belts or the like, and would require at least several minutes' time for each conversation.

Where the conversion is to be a permanent one, the need for tools, parts and a few minutes of time presents no problem at all. However, there are areas in parts of the world in which electric power is available only sporadically, areas where damage to attenuated power lines is frequent, or where electric power is available only while a local factory or mill is operating. In these areas, the sewing machine user, as contrasted with sewing machine dealers, would have to make the conversion from electric to foot power in order to continue sewing. Moreover, the conversion may be required quite frequently so that the requirement of time, tools and exchange parts of the conventional conversion becomes onerous.

It is an object of this invention to provide a sewing machine driving device which may be converted from electric motor drive to foot treadle drive in a matter of a few seconds without the use of tools or exchange parts.

It is also an object of this invention to provide a sewing machine driving device of the above character in which by the shift of an operator influenced control member, the operative connection between the driving device and the stitch forming instrumentalities of the sewing machine may be interrupted or reestablished whether the electric motor or the foot treadle is being used as the source of power.

With the above and other objects and advantages in view as will hereinafter appear, this invention comprises the devices, combinations, and arrangements of parts hereinafter described and illustrated in the accompanying drawings of a preferred embodiment in which:

FIG. 1 represents a fragment of a sewing machine frame in elevation with a portion including the sewing machine handwheel having this invention applied thereto broken away and illustrated in vertical cross section,

FIG. 2 represents an enlarged vertical cross sectional view of a portion of the handwheel device of FIG. 1 but showing the parts in a different position of adjustment,

FIG. 3 is a cross sectional view taken substantially along line 3-3 of FIG. 2,

FIG. 4 is an elevational view of the handwheel clutch engaging and disengaging unit detached from the sewing machine main shaft and,

FIG. 5 is a cross sectional view taken substantially along line 5-5 of FIG. 4.

Referring to FIG. 1, 11 designates the bracket arm portion of a conventional household sewing machine frame within which is formed a partition 12. Set into the partition 12 is a bushing 13 in which a main drive shaft 14 for the sewing machine is journaled. At the free extremity, the main drive shaft 14 is formed with external threads 15 and with diametrically opposed keyways 16. Fixed on the main drive shaft 14 as by a pin

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17 is a sleeve 18 which may be formed with a counterbalance flange 19.

A handwheel indicated generally at 21 is formed with a bore 22 and with an extended hub portion 23 journaled on the sleeve 18. The handwheel 21 includes a circular rim 24 accessible to the sewing machine operator externally of the machine frame and a pulley portion 25 formed with a belt groove 26. The exposed face of the handwheel is formed with a concavity of which the external portion 27 is preferably dish shaped while the internal portion 28 is of right circular configuration. As illustrated in FIG. 3, the bore 22 adjacent to the concavity 28 is formed with a series of equally spaced and diametrically opposed keyways 29.

The handwheel 21 is constrained on the sleeve 18 between the flange 19 of the sleeve 18 and a shouldered portion 30 of a spacing collar 31 on the main drive shaft which spacing collar abuts the sleeve 18 and is secured by a nut 32 engaging the threads 15 of the main drive shaft.

As thus far described, the handwheel 21 may be turned by the hand of the sewing machine operator applied on the handwheel rim 24 or from a conventional foot treadle (not shown) by way of a belt 33 arranged in the belt groove 26 of the pulley portion 25. In addition to either hand or foot treadle operation, the driving arrangement of this invention provides for an electric motor drive from an electric motor 40 carried within the machine frame. In FIG. 1 is illustrated an electrical receptacle 41 from which lead wires 42 and 43 are directed to the motor 40. The motor illustrated in FIG. 1 includes an attenuated motor shaft 44 extending vertically upwardly and terminating in a drive worm 45 meshing with a worm wheel 46 journaled freely on the handwheel hub portion 23 against a spring clip 47 seated in an annular groove in the hub portion.

Journaled freely on the hub portion 23 of the handwheel at the side of the worm wheel 46 opposite the spring clip 47 is a spacing disk 48 formed with a lateral flange 49. Adjacent to the spacing disk 48 and also journaled freely on the handwheel hub portion 23 is a clutch disk 50 formed with a lateral flange 51 which is accommodated within the spacing disk flange 49 so that the disks 48 and 50 together encompass an annular cavity 52. Within the cavity 52 is arranged a coil spring 53 having one offset end portion 54 received in a hole 55 through both the worm wheel 46 and spacing disk 48 and the other offset end portion 56 received in a hole 57 through the clutch disk 50, which clutch disk 50 abuts the pulley portion 25 of the handwheel.

The clutch disk 50 is engaged and separated from the handwheel 21 by means of three clutch pins 60 slidable lengthwise in three counterbored holes 61 drilled parallel to the handwheel bore 22 at equal radii and at equal distances from each other through the pulley portion 25 of the handwheel. The clutch pins are each fixed in a cup shaped handle member 62 accommodated slidably in the cylindrical concavity 38 of the handwheel. As illustrated in FIG. 2, a cup shaped metal keeper 63 is forced into the counterbored portion of each of the holes 61 constraining therein a frictioning washer 64 which tightly grips but through which the respective clutch pins 60 may be forced so as to prevent accidental movement of the clutch pins and handle member 62 axially of the main drive shaft.

The clutch disk 50 is formed with clutch pin accommodating apertures 65 preferably in a multiple of the three clutch pins so that when the handle member 22 is depressed, as shown in FIG. 1, the clutch pins will find mating apertures 65 in the clutch disk in the course of only a small angular movement of the handwheel relatively to the main drive shaft.

To ready the sewing machine for electric motor drive, therefore, it is only necessary to depress the handle member 62 while turning the handwheel 21 slightly so that the clutch pins will seat in the apertures 65 in the clutch disk. It is preferable that the belt 33 should then be disengaged from the foot treadle when the electric motor is used to drive the machine.

To ready the sewing machine for foot treadle drive, it is only necessary to draw out the handle member 62 disengaging the clutch pins 60 from the clutch disk 50 and to entrain the belt 33 on the foot treadle mechanism.

There are in the sewing machine art many conventional bobbin winding devices which are adapted to be driven by frictional engagement with the sewing machine handwheel while the handwheel is turned by the sewing machine drive motor or treadle. It is preferable when such bobbin winding devices are employed that the drive to the stitch forming mechanisms of the sewing machine be discontinued so that, for instance, work may remain uninfluenced in sewing position in the machine during the bobbin winding process.

The combination motor-treadle drive unit of this invention includes a clutching device for coupling the handwheel 21 to the main drive shaft 14 which is effective whether the motor 40 or the belt 33 is arranged to drive the handwheel. The construction of this invention is thus adapted for use on a machine having a conventional bobbin winder.

For coupling the handwheel 21 to the main drive shaft 14, a U-shaped spring metal member 70 is slidable axially of the main drive shaft with each arm 71 thereof constrained in one of the diametrically opposite keyways 16 of the main drive shaft. The arms 71 extend in the keyways 16 internally of the threads of the nut 32 and beyond the extremity of the main drive shaft 14, the base 72 of the U-shaped member 70 has a handle 73 secured thereto as by a fastening screw 74.

The extremity of each arm 71 of the member 70 is formed with an out-turned dog element 75, each of which preferably comprises an out-turned portion of the arm 71 with the extremity bent and turned inwardly against the out-turned portion. The dog elements 75 extend radially outwardly of the keyways 16 in the main drive shaft and into diametrically opposed radially extending slots 76, 76 formed in the collar 31.

When the member 70 is shifted outwardly along the main drive shaft 14 into the position illustrated in FIG. 2, the dog elements 75 will be retracted in the slots 76 which the shoulder 30 of the collar member 31 and the handwheel 21 will be completely free of the main drive shaft 14. When the handle 73 is depressed and the member 70 shifted inwardly along the main drive shaft, the dog elements 75 will be carried clear of the shoulder 30 of the collar member 31 and upon becoming aligned with any of the diametrically opposed pairs of keyways 29 in the handwheel 21 will enter those keyways 29 to clutch the handwheel to the main drive shaft. The arms 71 of the U-shaped member 70 are preferably initially formed to converge slightly as illustrated in FIG. 5 so as to grip snugly the bottom of the main shaft keyways 16 and provide frictional resistance to prevent accidental displacement of the member 70 axially of the main drive shaft.

Having set forth the nature of this invention what I claim herein is:

1. A driving arrangement for a sewing machine having a drive shaft comprising a handwheel journaled relatively to said drive shaft, means secured for rotation with said handwheel and adapted to be drivingly connected with a foot treadle device, a drive element journaled relatively to said drive shaft, an electric motor operatively connected to said drive element, a first operator influenced clutch means for selectively coupling said handwheel to said drive element, said clutch being disengageable to completely uncouple said handwheel from said

drive element, and a second operator influenced clutch means for selectively coupling said handwheel to said sewing machine drive shaft.

2. A driving arrangement for a sewing machine having a frame and a drive shaft journaled in said frame comprising, a handwheel journaled relatively to said drive shaft and having an exposed face outside said sewing machine frame, means secured for rotation with said handwheel and adapted to be drivingly connected with a foot treadle device, a drive element journaled relatively to said drive shaft, an electric motor carried in said frame and operatively connected to said drive element, a first clutch means for selectively coupling said handwheel to said drive element, said clutch being disengageable to completely uncouple said handwheel from said drive element, a second clutch means for selectively coupling said handwheel to said sewing machine drive shaft, and a pair of operator influenced handles each accessible on the exposed face of said handwheel and operatively connected to engage and disengage said first and second clutch means respectively.

3. A device as set forth in claim 2 in which said exposed face of said handwheel is formed with a concave dished configuration, and said pair of operator influenced clutch operating handles are each shiftable axially of said drive shaft and disposed substantially within said dished shaped handwheel concavity.

4. A device as set forth in claim 2 in which said exposed face of said handwheel is formed with a concave dished configuration, said operator influenced clutch operating handle for said first clutch means comprises an annular member disposed substantially within said dished shaped handwheel concavity and formed with a concave dish shaped exposed face, and said operator influenced clutch operating handle said dished shape first clutch operating handle concavity.

5. A driving arrangement for a sewing machine having a drive shaft comprising, a handwheel formed with an attenuated hub journaled relatively to said drive shaft, means secured for rotation with said handwheel and adapted to be drivingly connected with a foot treadle device, a drive disk journaled on said handwheel hub and formed with a clutch aperture extending parallel to said drive shaft, an electric motor operatively connected to said disk, a clutch pin disposed parallel to said drive shaft and slidable axially in said handwheel, an operator influenced handle secured to said clutch pin exteriorly of said handwheel for selectively shifting said clutch pin into and completely out of a clutched position within said drive disk aperture, and a second operator influenced clutch means for selectively coupling said handwheel to said sewing machine drive shaft.

6. A device as set forth in claim 5 in which said handwheel is formed with a counterbored aperture for slidably accommodating said clutch pin, a keeper secured in the mouth of said counterbore defining an enclosed cavity therein through which said clutch pin extends, and a flexible washer tightly embracing said clutch pin within said cavity to deter accidental axial movement of said clutch pin.

7. A driving arrangement for a sewing machine having a drive shaft and a source of sewing machine driving power, a handwheel journaled relatively to said drive shaft, means secured for rotation with said handwheel and adapted to be drivingly connected with said source of sewing machine driving power, diametrically opposed keyways formed in said drive shaft and in said handwheel, a shiftable clutching member formed with bifurcated spring arms arranged one in each of said diametrically opposed drive shaft keyways and biased into engagement with the bottom of said drive shaft keyways, an out-turned clutch dog element formed on each of said bifurcated spring arms, and an operator influenced handle secured to said shiftable clutching member for shifting said clutch

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dog elements axially of said drive shaft into and out of
said diametrically opposed handwheel keyways, without
moving said drive shaft.

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